# Unit 1—Getting Started with Java

# Chapter 3—Syntax, Errors, and Debugging

EXERCISE 3.1

1. The vocabulary of a language is the set of words used in forming its sentences. Examples in Java are class, main, and {.
2. A java syntax rule for assignment statement is <variable> = <expression> ;.
3. The expression (x + y) \* z means add the values of x and y and multiply the result by the value of z.
4. One difference between a programming language and a natural language is that people often can understand the meaning of a grammatically incorrect expression in a natural language, whereas a computer must always have grammatically correct expressions in a programming language. Another difference is that a sentence in a natural language often can have more than one meaning, whereas a sentence in a programming language must have exactly one meaning.

exercise 3.2

1. A double is a floating-point number, whereas an int is a whole number.
2. Primitive data types use operands that appear with operators in expressions, whereas objects are sent messages.

a. 23.5E1

b. 46E-3

a. 322100

b. .0556

1. Two examples of string literals are “Hi there!” and “I’m studying programming.”.
2. A variable is a user-defined symbol that names a storage location whose contents or value can change.
3. None of them
4. double payRate = 35.67;
5. int a, b = 4, c;
6. A datum of type double and a datum of type String cannot be stored in a variable of type int.
7. final double POUNDS\_PER\_KG = 2.2;

a. 25

b. –3

c. 30

d. 0

a. – and \* are adjacent.

b. The expression is missing a left parenthesis.

c. There is no expression within the parentheses.

a. 2.25

b. 0.44… (repeats to maximum allowable precision)

c. 0.5

a. Valid

b. Valid

c. Syntax error (double assigned to int)

a. 8

b. 9

1. y = (int) (x + 0.5);

a. "JavaWizard"

b. "Java4Wizard"

c. "Java\nWizard\n"

1. String myInfo = "name\n" + "address\n" + "phone number\n";
2. A message is sent to an object, whereas a method is the code that executes when an object receives a message.
3. A method’s signature consists of a name and a list of zero or more parameters and their types.
   1. Valid
   2. Valid
   3. Invalid. A user-defined symbol must begin with a letter.
   4. Valid
   5. Invalid. A user-defined symbol cannot contain a question mark. It must be a letter and/or digits.
   6. diameter
   7. STANDARD\_DEDUCTION or standardDeduction
   8. drawRectangle
4. x names the outermost package or directory that contains y. y names the package or directory that contains the byte code for the class named Z.
5. All the classes contained in the package x.y are made available to the importing file.

EXERCISE 3.3

1. a. System.out.print("Enter the hourly wage: ");

double hourlyWage = reader.nextDouble();

b. System.out.print("Enter the Social Security number: ");

String ssn = reader.nextLine();

1. The purpose of the method nextInt() is to read an integer value as input.
2. The method nextInt() returns an integer to the program, but leaves trailing whitespace, including the user’s carriage return, behind. This whitespace ending in a carriage return is then consumed and returned by the following call of nextLine() before the user can enter the next data value.

EXERCISE 3.4

1. An end-of-line comment is prefixed with the // symbol. This kind of comment can go anywhere on a line and extends from the // symbol to the end of the current line. A multiline comment begins with the symbol /\* and ends with the symbol \*/. This kind of comment can extend for several lines.
2. Do not under-comment. At least provide comments that describe the purpose of the program and explain any complex code that might be unclear to a reader. Do not over-comment. Most of the time, code should be self-documenting; that is, it should be written in a way so that the reader understands the meaning just from the words used.

EXERCISE 3.5

1. Syntax errors are detected at compile time. Run-time and logic errors are detected at run time.
2. The attempt to divide by 0 is a run-time error. This error cannot be caught before run time if the divisor operand is a variable because a variable cannot receive a value until run time.

a. Run-time error

b. Compile-time error

c. Logic error

EXERCISE 3.6

1. To track down the cause of a logic error, one can examine the values that variables have at a spot close to the suspected source of the error. One does this by inserting output statements with these variables before and after the suspected code. Of course, one needs an idea about which piece of code is under suspicion before inserting these output statements.
2. To find the error, insert output statements before and after the line that assigns a value to area. Each output statement should output the values of all the numeric variables.

EXERCISE 3.7

a) g.fillRect(45, 20, 100, 50);

b) g.drawLine(20, 20, 100, 100);

c) drawOval(50, 50, 150, 150);

d) drawLine(100, 100, 50, 50);

drawLine(50, 50, 200, 200);

drawLine(200, 200, 100, 100);

1. Define a panel class with a constructor that sets its background to red. Define a paintComponent method that sets the graphics object’s color to blue and draws a filled rectangle.
2. The x coordinate is the panel’s width divided by 2, and the y coordinate is the panel’s height divided by 2. The methods getWidth() and getHeight() obtain these values.
3. The three properties of a text font are its style, size, and name.

Review Questions

## Written Questions

1. Algorithm for determining a batting average:

Get number of at bats

Get number of hits

Set average to 1.0 \* number of hits / number of at bats

Output average with three figures of precision

1. 56, 3.14, “Hello there!”

String name;

int age;

double wage;

1. Some operators, such as \*, have a higher precedence than others, such as +. They are not simply evaluated in left-to-right order.
2. Yes, it is possible to assign a value of type int to a variable of type double because type double is more inclusive than type int.
3. a. Valid

b. Invalid because import is a reserved word

c. Invalid because identifiers cannot begin with a digit

d. Invalid because identifiers cannot contain hyphens

e. Valid

## Fill in the Blank

1. double
2. signature
3. concatenation
4. //
5. %, int